Controller 302 provides control outputs which are a control inputs to power source 304 in response to the program therein, as adjusted by the arc control module. Power source, or source of power, as used herein, includes the power circuitry such as rectifiers, switches, transformers, SCRs, etc. that process and provide the output power. Control input, as used herein, includes an input used to control a power supply, such as a set point, gate signals, phase control signals, etc. Control output, as used herein, includes an output used to control a circuit, such as a setpoint, switch signals, gate signals, phase control signals, etc.

Numerous modifications may be made to the present invention which still fall within the intended scope hereof. Thus, it should be apparent that there has been provided in accordance with the present invention a method and apparatus for controlling a welding process that fully satisfies the objectives and advantages set forth above. Although the invention has been described in conjunction with specific embodiments thereof, it is evident that many alternatives, modifications and variations will be apparent to those skilled in the art. Accordingly, it is intended to embrace all such alternatives, modifications and variations that fall within the spirit and broad scope of the appended claims.

CLAIMS

The embodiments of the invention in which an exclusive property or privilege is claimed are defined as follows:

1. A welding power supply having an arc-width control, comprising:

a power circuit having a welding output and at least one control input, wherein the welding output is characterized by a plurality of output welding parameters; and

a controller, having at least one control output, connected to the at least one control input, and having a user adjustable arc-width control input, and a user adjustable wire feed speed input, wherein the controller includes an arc width control module having as inputs the wire feed speed input and the arc width control input, and having at least one welding parameter adjustment output, and wherein the at least one welding parameter adjustment output has a gain responsive to the wire feed speed input, such that there are at least three gains over a range of possible wire feed speeds.

2. The welding power supply of claim 1, wherein the at least one welding parameter adjustment output gain varies over the entire range of possible wire feed speeds.

3. The welding power supply of claim 1, wherein the at least one welding parameter adjustment output gains have at least three taught points for a given wire feed speed.

4. The welding power supply of claim 3, wherein the welding parameter adjustment output gains are interpolated between the at least three taught points.

5. The welding power supply of claim 1, wherein the plurality of output welding parameters include peak amps, background amps, pulse width, frequency, adaptive voltage, ramp up and ramp down, and the at least one welding parameter adjustment includes adjustments for at least three of the plurality of output parameters.

6. The welding power supply of claim 5, wherein the at least one welding parameter adjustment includes adjustments for at least five of the plurality of output parameters.

7. The welding power supply of claim 6, wherein the at least one welding parameter adjustment includes adjustments for at least six of the plurality of output parameters.

8. A welding power supply having an arc-width control, comprising:

a power circuit having a welding output and at least one control input, wherein the welding output is characterized by at least five output parameters; and

a controller, having at least one control output, connected to the at least one control input, and having a user adjustable arc-width control input, and a user adjustable wire feed speed input, wherein the controller includes an arc width control module having as inputs the wire feed speed input and the arc width

control input, and having at least five welding parameter adjustment outputs that are responsive to the wire feed speed input and the arc-width control input.

9. The welding power supply of claim 8, wherein the at least five welding parameter adjustment outputs have gains responsive to the wire feed speed input, wherein the gains vary over the entire range of possible wire feed speeds.

10. The welding power supply of claim 9, wherein the at least five welding parameter adjustment output gains has at least three taught points for a given wire feed speed.

11. The welding power supply of claim 10, wherein the at least five welding parameter adjustment output gains are interpolated between the at least three taught points.

12. The welding power supply of claim 9, wherein the at least five output parameters include peak amps, background amps, pulse width, frequency, and adaptive voltage, and the at least five welding parameter adjustment outputs includes adjustments for peak amps, background amps, pulse width, frequency, and adaptive voltage.

13. The welding power supply of claim 12, wherein the at least five output parameters further include ramp up and ramp down, and the at least five welding parameter adjustment outputs further include adjustments for ramp up and ramp down.

14. A welding power supply comprising:

a source of power, having at least one power source control input;

a wire feeder, connected to the source of power and having at least one wire feeder control input; and

a controller having welding parameter outputs connected to the power source control input and the wire feeder control input, and further including an arc width input, wherein at least five welding parameters are simultaneously controlled in response to the arc width input such that a desired arc width is obtained, without changing other arc characteristics.

15. The welding supply of claim 14 wherein the at least five welding parameters include at least five of peak amps, background amps, pulse width, pulse frequency, adaptive voltage, ramp up and ramp down.

16. A welding power supply having an arc-width control, comprising:

power means for providing a welding output in response to at least one control input, wherein the welding output is characterized by a plurality of output welding parameters; and

control means for controlling the power means with at least one control output connected to the at least one control in response to a user adjustable arc-width control input and a user adjustable wire feed speed input, wherein the control means includes an arc width control means for controlling arc width, and having as inputs the wire feed speed input and the arc-width control input, and having at least one welding parameter adjustment output, and wherein the at least one welding parameter adjustment output has a gain responsive to the wire feed speed input, such that there are at least three gains over a range of possible wire feed speeds.

17. The welding power supply of claim 16, wherein the at least one welding parameter adjustment output gain varies over the entire range of possible wire feed speeds.

18. The welding power supply of claim 17, wherein the at least one welding parameter adjustment output gains have at least three taught points for a given wire feed speed.

19. The welding power supply of claim 18, further including means for interpolating the welding parameter adjustment output gains are between the at least three taught points.

20. The welding power supply of claim 21, wherein the plurality of output parameters include peak amps, background amps, pulse width, frequency, adaptive voltage, ramp up and ramp down, and the at least one welding parameter adjustment includes adjustments for at least three of the plurality of output parameters.

21. The welding power supply of claim 21, wherein the at least one welding parameter adjustment includes adjustments for at least five of the plurality of output parameters.

22. The welding power supply of claim 21, wherein the at least one welding parameter adjustment includes adjustments for at least six of the plurality of output parameters.

23. A welding power supply having an arc-width control, comprising:

power means for providing a welding output in response to at least one control input, wherein the welding output is characterized by at least five output parameters; and

control means for controlling the power means with at least one control output connected to the at least one control input in response to a user adjustable arc-width control input and a user adjustable wire feed speed input, and for providing at least five welding parameter adjustment outputs that are responsive to the wire feed speed input and the arc-width control input.

24. The welding power supply of claim 23, wherein the at least five welding parameter adjustment outputs have gains responsive to the wire feed speed input, wherein the gains vary over the entire range of possible wire feed speeds.

25. The welding power supply of claim 24, wherein the at least five welding parameter adjustment output gains has at least three taught points for a given wire feed speed.

26. The welding power supply of claim 25, wherein the at least five welding parameter adjustment output gains are interpolated between the at least three taught points.

27. The welding power supply of claim 26, wherein the at least five output parameters include peak amps, background amps, pulse width, frequency, and adaptive voltage, and the at least five welding parameter adjustment outputs includes

adjustments for peak amps, background amps, pulse width, frequency, and adaptive voltage.

28. The welding power supply of claim 25, wherein the at least five output parameters further include ramp up and ramp down, and the at least five welding parameter adjustment outputs includes further include adjustments for ramp up and ramp down.

29. A welding power supply comprising:

power means for providing welding power in response to at least one power source control input;

wire feeding means, connected to the source of power, for feeding wire in response to at least one wire feeder control input; and

control means for providing welding parameter outputs, connected to the power source control input and the wire feeder control input, and further including an arc width input, and further for simultaneously controlling at least five welding parameters are in response to the arc width input such that a desired arc width is obtained, without changing other arc characteristics.

30. The welding supply of claim 29 wherein the at least five welding parameters include at least five of peak amps, background amps current, pulse width, pulse frequency, adaptive voltage, ramp up and ramp down.

31. A method of providing welding power, comprising:

providing welding power, wherein the power is characterized by a plurality of output parameters; and

controlling the power, and the plurality of output parameters, in response to a user adjustable output set point; and

controlling arc width and the user adjustable set point in response to a user adjustable arc-width control input, by adjusting the plurality of output parameters with a gain, wherein the gain has at least three values over a range of possible user adjustable output set points.

32. The method of claim 31, wherein the user adjustable output set point is a wire feed speed setting.

33. The method of claim 32, wherein the gain varies over the entire range of possible user adjustable output set points.

34. The method of claim 31, wherein the gain varies over the entire range of possible user adjustable output set points.

35. The method of claim 34, wherein the gains have at least three taught points for a given wire feed speed.

36. The method of claim 35, wherein the gains are interpolated between the at least three taught points.

37. The method of claim 31, wherein the plurality of output parameters include peak amps, background amps, pulse width, frequency, adaptive voltage, ramp up and ramp down, and the adjusting includes adjusting at least three of the plurality of output parameters.

38. The method of claim 37, wherein the adjusting includes adjusting at least five of the plurality of output parameters.

39. The method of claim 37, wherein the adjusting includes adjusting at least six of the plurality of output parameters.

40. A method of arc welding, comprising:

providing welding power in response to at least one control input, wherein the welding power is characterized by at least five output parameters; and

controlling the power in response to a user adjustable arc-width control input and a user adjustable wire feed speed input by adjusting the at least five parameters in response to the wire feed speed input and the arc-width control input.

41. The method of claim 40, wherein the at least five welding parameter adjustments have gains responsive to the wire feed speed input, wherein the gains vary over the entire range of possible wire feed speeds.

42. The method of claim 40, wherein the at least five welding parameter adjustment output gains have at least three taught points.

43. The method of claim 42, wherein the at least five welding parameter adjustment output gains are interpolated between the at least three taught points.

44. The method of claim 40, wherein the at least five welding parameter adjustment output gains have at least three taught points.

45. The method of claim 44, wherein the at least five output parameters further include ramp up and ramp down, and the at least five welding parameter adjustment outputs includes further include adjustments for ramp up and ramp down.

46. A method of providing welding power comprising:

feeding wire to a weld;

providing power to the weld; and

controlling output parameter of the power and the speed of feeding wire in response to a user adjustable arc width input, wherein at least five output parameters are simultaneously controlled in response to the arc width input such that a desired arc width is obtained, without changing other arc characteristics.

47. The method of claim 46 wherein the at least five welding parameters include at least five of peak amps, background amps current, pulse width, pulse frequency, adaptive voltage, ramp up and ramp down.